

**PRECISE PHASE SHIFTING USING A DLL CONTROLLED, MULTI-  
STAGE DELAY CHAIN**

**ABSTRACT**

Circuits, methods, and apparatus that provide a precise phase shift for a read strobe or other signal. One embodiment provides a read strobe delay line including a series of delay elements, where inputs or outputs of at least some of delay elements are received by a multiplexer. One input of this multiplexer is selected as the read strobe signal. Further precision adjustment may be made in the delay of the read strobe signal by using a delay line in a reference delay-locked loop, where that delay line also includes a series of delay elements, and inputs or outputs of at least some of the delay elements are multiplexed.

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